

ENHANCEMENT OF eMUSEUM: PROTOTYPE
DEVELOPMENT OF EXHIBIT,
INFORMATIVE AND E-COMMERCE
APPLICATION

A Project Paper submitted to the Graduate School in partial fulfillment of the
requirements for the Master of Science (Information Technology)
College of Arts and Science
Universiti Utara Malaysia

By
Norhayati Binti Izhar 88293

MAY 2008

7K
5105-888
N 839 e
2008

ENHANCEMENT OF eMUSEUM: PROTOTYPE
DEVELOPMENT OF EXHIBIT,
INFORMATIVE AND E-COMMERCE
APPLICATION

A Project Paper submitted to the Graduate School in partial fulfillment of the
requirements for the Master of Science (Information Technology)
College of Arts and Science
Universiti Utara Malaysia

By
Norhayati Binti Izhar 88293

MAY 2008



KOLEJ SASTERA DAN SAINS
(College of Arts and Sciences)
Universiti Utara Malaysia

PERAKUAN KERJA KERTAS PROJEK
(*Certification of Project Paper*)

Saya, yang bertandatangan, memperakukan bahawa
(I, the undersigned, certify that)

NORHAYATI BINTI IZHAR

calon untuk ijazah
(*candidate for the degree of*) MSc. (IT)

telah mengemukakan kertas kerja projek yang bertajuk
(*has presented his/her project paper of the following title*)

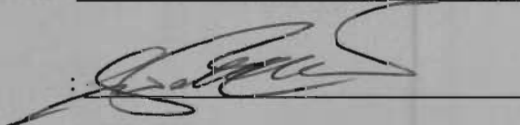
**EHANCEMENT OF eMUSEUM: PROTOTYPE DEVELOPMENT of
EXHIBIT, INFORMATIVE AND E-COMMERCE APPLICATION**

seperti yang tercatat di muka surat tajuk dan kulit kertas projek
(*as it appears on the title page and front cover of project paper*)

bahawa kertas projek tersebut boleh diterima dari segi bentuk serta kandungan
dan meliputi bidang ilmu dengan memuaskan.
(*that the project paper acceptable in form and content, and that a satisfactory
knowledge of the field is covered by the project paper*).

Nama Penyelia Utama
(*Name of Main Supervisor*): MR. SUWANNIT CHAREEN CHIT S/O SOP CHIT

Tandatangan
(*Signature*)

: 

Tarikh
(*Date*)

: 1 JUNE '08

PERMISSION TO USE

In presenting this thesis in partial fulfillment of the requirements for a postgraduate degree from Universiti Utara Malaysia, I agree that the University Library may make it freely available for inspection. I further agree that permission for copying of this thesis in any manner, in whole or in part, for scholarly purpose may be granted by my supervisor(s) or, in their absence by the Dean of the Graduate School. It is understood that any copying or publication or use of this thesis or parts thereof for financial gain shall not be allowed without my written permission. It is also understood that due recognition shall be given to me and to Universiti Utara Malaysia for any scholarly use which may be made of any material from my thesis.

Requests for permission to copy or to make other use of materials in this thesis, in whole or in part, should be addressed to

Dean of Graduate School
Universiti Utara Malaysia
06010 UUM Sintok
Kedah Darul Aman.

ABSTRACT

The Government of Malaysia has encourage the use of Information Technology application among the public and private sector to enable both sector to compete and provide better facilities to the nation. In the education sector, the Ministry of Education had provided a module to teach children about computer at the age of six in primary school. Most brick and mortar or physically located organizations also have seeked alternatives to do business particularly via online. Malaysians have adopted to online transactions with most of the government agencies via the Internet. The Ministry of Unity, Culture, Arts and Heritage had developed a website which is accessible to anyone and anywhere in the world who seeks information about Malaysian culture and heritage. Bringing museum online is a new perspective in exhibiting the cultural and heritage. Public authorities or private entities are the bodies that have undertaken efforts to digitalize this important heritage.

ACKNOWLEDGEMENT

In the name of Allah the most Gracious and Merciful, Alhamdullilah for the strength that had been given to complete and finish this research. The completion of this research is through relentless corporation of several persons in giving the guidance.

The utmost appreciation goes to my supervisor, Mr. Suwannit Chareen Chit for his guidance, counsel and patience throughout the research project. His knowledge, advice, criticism, help, support, and understanding helped me in writing this research.

Special thanks and appreciation goes to Mrs. Janet Tee Siew Mooi who is the Deputy Director of National Museum, for her willingness to corporate in contributing some insights for this research project. Also thanks to others that has been tolerant and patient in supporting me in my efforts to compete this research project.

Thank you for the companion.

May Allah bless us.

Thank you.

TABLE OF CONTENT

| | PAGE |
|---|---------|
| TITLE PAGE | I |
| CERTIFICATION OF PROJECT PAPER | II |
| PERMISSION TO USE | III |
| ABSTRACT | IV |
| ACKNOWLEDGEMENT | V |
| TABLE OF CONTENT | VI-VIII |
| LIST OF FIGURES | IX-X |
| LIST OF TABLES | XI |
| CHAPTER ONE: INTRODUCTION | |
| 1.0 Introduction | 1-2 |
| 1.1 Problem Statement | 2-5 |
| 1.2 Research Questions | 5 |
| 1.3 Research Objectives | 6 |
| 1.4 Scope of Study | 6 |
| 1.5 Significance of Research | 6-7 |
| CHAPTER TWO: LITERATURE REVIEW | |
| 2.0 Introduction | 8 |
| 2.1 Introduction of Online Museum | 8-11 |
| 2.2 Exhibition of Artifacts (Providing Informative Content) | 11-18 |
| 2.3 Implementing Electronic Commerce | 18-20 |
| 2.4 Conclusion | 21 |
| CHAPTER 3: RESEARCH APPROACH AND METHODOLOGY | |
| 3.0 Introduction | 22 |
| 3.1 Research Model | 22-25 |
| 3.1.1 Research Model Used For the Research | 26 |

| | |
|--|-------|
| 3.1.1.1 Plan Project | 27 |
| 3.1.1.2 Activate Project | 27 |
| 3.1.1.3 Control Project | 27 |
| 3.1.1.4 Requirements Planning | 28 |
| 3.1.1.5 User Design | 28 |
| 3.1.1.6 Rapid Construction | 29-30 |
| 3.1.1.7 Transition | 30 |
| 3.1.1.8 End Project | 30 |
| 3.2 Research Approach | 30-31 |
| 3.2.1 Primary Data | 32-33 |
| 3.2.2 Secondary Data | 33 |
| 3.3 Research Design Chart | 34 |
| 3.4 Conclusion | 35 |
| CHAPTER 4: EXPECTED OUTCOME AND CONCLUSION | |
| 4.0 Introduction | 36 |
| 4.1 Outcome 1: System Design | 36 |
| 4.1.1 System Design for Exhibit (Providing Informative Content) | 37 |
| 4.1.1.1 Main Use Case Diagram for Exhibit (Providing Informative Content) | 37-39 |
| 4.1.1.2 Exhibit Use Case Diagram (Providing Informative Content) | 39-40 |
| 4.1.1.3 Class Diagram for Exhibit (Providing Informative Content) | 41 |
| 4.1.2 System Design for Electronic Commerce Application | 41-42 |
| 4.1.2.1 Electronic Commerce Use Case Diagram | 42-44 |
| 4.1.2.2 Class Diagram for Electronic Commerce | 45 |
| 4.2 Outcome 2: Prototype for the Enhancement of National Museum Website | 46-63 |

| | |
|--|-------|
| 4.3 Outcome 3: Testing the Prototype | 64 |
| 4.3.1 Perceived Usefulness | 64-66 |
| 4.3.2 Perceived Easy Of Use | 66-67 |
| 4.3.3 Behavioral Intention | 67-69 |
| 4.4 Conclusion and Recommendation | 70 |
| LIST OF REFERENCES | 71-75 |
| APPENDIXES | |
| Appendix A: Interactive Conversational Character as a Virtual Tour Guide to an Online Museum Exhibition | 76 |
| Appendix B: Virtual Galleries: Is 3D better? | 77 |
| Appendix C: Unstructured Questionnaire | 78 |
| Appendix D: Observation Form | 79 |
| Appendix E: Structured Questionnaire | 80 |

LIST OF FIGURES

| FIGURE NO. | NAME | PAGE |
|------------|--|------|
| 1.1 | Main Page National Museum Official Website | 3 |
| 1.2 | Displayed Items | 4 |
| 1.3 | Museum Shop | 5 |
| 2.1 | Electronic Guidebook and Headset | 10 |
| 2.2 | Beginning the Tour | 12 |
| 2.3 | Overview of Proposed System | 14 |
| 2.4 | Example 3D Virtual Gallery | 16 |
| 3.1 | Waterfall Model | 24 |
| 3.2 | RAD Process in Traditional Development Research Model | 26 |
| 3.3 | Technology Acceptance Model | 30 |
| 3.4 | The Process of Research Approach | 31 |
| 4.1 | Main Use Case Diagram | 38 |
| 4.2 | Main Class Diagram | 39 |
| 4.3 | Use Case Diagram for Exhibit | 40 |
| 4.4 | Class Diagram for Exhibit | 41 |
| 4.5 | Use Case Diagram for Electronic Commerce | 43 |
| 4.6 | Use Case Diagram for Administrator | 44 |
| 4.7 | Class Diagram for Electronic Commerce | 45 |
| 4.8 | First page of the website | 46 |
| 4.9 | Home of the website | 47 |
| 4.10 | The Galleries | 48 |
| 4.11 | Floor Plan | 49 |
| 4.12 | Museum Shop (Electronic Commerce) | 50 |
| 4.13 | Gift and Souvenir (Electronic Commerce) | 51 |
| 4.14 | Order Item (Electronic Commerce) | 52 |
| 4.15 | Gallery | 53 |
| 4.16 | Gallery C (Informative Content) | 54 |

| | | |
|------|---|----|
| 4.17 | Gallery C (Providing Informative Content) (A) | 55 |
| 4.18 | Gallery C (Providing Informative Content) (B) | 56 |
| 4.19 | e-Shop Maintenance System | 57 |
| 4.20 | New User / Administrator Registration | 58 |
| 4.21 | Administrator Main Page | 59 |
| 4.22 | Add Record for Jewelry Items | 60 |
| 4.23 | View Record of Jewelry Items | 61 |
| 4.24 | Delete Record | 62 |
| 4.25 | Update Record | 63 |

LIST OF TABLES

| TABLE NO. | NAME | PAGE |
|-----------|----------------------------------|------|
| 3.1 | Example of Process in the System | 28 |
| 3.2 | Research Design Chart | 34 |
| 4.1 | Perceived Usefulness (1) | 64 |
| 4.2 | Perceived Usefulness (2) | 65 |
| 4.3 | Perceived Usefulness (3) | 65 |
| 4.4 | Perceived Usefulness (4) | 66 |
| 4.5 | Perceived Usefulness (5) | 66 |
| 4.6 | Perceived Easy Of Use (1) | 67 |
| 4.7 | Perceived Easy Of Use (2) | 67 |
| 4.8 | Perceived Easy Of Use (3) | 68 |
| 4.9 | Behavioral Intention | 68 |

CHAPTER ONE

INTRODUCTION

1.0 Introduction

Information Technology changes rapidly. Nowadays, Information Technology applications have brought alternatives for solutions in most circumstances that occur in life. Information Technology can be implemented in most area such as education, industrial, medical, social life, and others. The Government of Malaysia has asked the public and private sector to implement technology as to enable the private and public sector to compete and provide better facilities to Malaysian citizens. There is thousands and more business transaction can be done via online. More over, most brick and mortar or physically located organizations conduct their business transaction via internet.

The Ministry of Unity, Culture, Arts and Heritage in Malaysia has developed a website that can be accessed by anyone and anywhere in the world which seek information about Malaysian culture. Bringing museum online is a new perspective of exhibiting the cultural heritage. Public authorities or private entities are the bodies that have undertaken efforts to digitalize this important heritage. Digital museum has brought new alternatives of visiting physical museum. It is either for the purpose of post-visit or pre-visit to the main physical location on the museum. This research conducted as enhancement for the existing electronic museum that was developed by Malaysian Government in 2003 (www.museum.gov.my).

The contents of
the thesis is for
internal user
only

REFERENCES

- Almedia, P., and Shigeki, Y. (2002). Interactive Conversational Character as a Virtual Tour Guide to an Online Museum Exhibition. *Proceedings of the International Conference on Computers in Education (ICCE'02)*.
- Basu, A., Cheng, I., Mistri, A., and Welford, D. (2001). Scalable Visualization of Super High Resolution 3D Images for Museum Archiving. *ACM Digital Library*. 320.
- Bowen, J. (2002). A community for museum e-commerce. *School of Computing, South Bank University*. 1-15.
- CASEMaker Totem. (2000). Rapid Application Development. *CASEMaker Inc.*
- Chan, H., C., and Teo, H., H. (2007). Evaluating the Boundary Conditions of the Technology Acceptance Model: An Exploratory Investigation. *ACM Transactions on Computer-Human Interaction*. 1-22.
- Chen, B., Hung, S., and Hong, J. (2003). Modularization Framework for Digital Museum Exhibition. *Proceedings of the 2003 Joint Conference on Digital Libraries (JCDL'03)*.
- Cosmas, J., Itegaki, T., Green, D., Grabczewski, E., Weimer, F., Gool, L., C., Zalesny, A., Vanrintel, D., Leberl, F., Grabner, M., Schindler, K., Karner, K., Gervautz, M., Hynst, S., Waelkens, M., Pollefeys, M., DeGeest, R., Sablatnig, R., and Kampel, M. (2002). 3D MURALE: A Multimedia System for Archaeology. *ACM Digital Library*. 297-305.
- Counsell, J. (2002). An Evolutionary Approach to Digital Recording and

Information about Heritage Sites. *Association for Computing Machinery, Inc.*

- Dodsworth, C., and Mayer, J. (2002). Cultural Heritage and Digital Experience Design: Presentation, Adaptation and Competitive Evolution. *ACM Digital Library*. 283.
- Fujitani, S., Mitsuishi, S., and Makihara, M. (2002). Design of Web-based Support System of Educational Programs for Museum of Science and Innovation. *Proceedings of the International Conference on Computers in Education(ICCE'02)*.
- Gantthead.com. (2008). *Rapid Application Development Process*. Retrieved January 23, 2008, from <http://www.gantthead.com/content/processes/2707.cfm>
- Graham, M., Kennedy, J., and Downey, L. (2006). Visual Comparison and Exploration of Natural History Collections. *ACM Digital Library*. 310-313.
- Gruhn, V., Mocker, M., and Schope, L. (2002). Development of an Electronic Commerce Portal System using a Specific Software Development Process. *Conferences in Research and Practice in Information Technology*. 10. 93-101.
- Grinter, R. E., Aoki, P. M., Hurst, A., Szymanski, M. H., Thornton, J. D., and Woodruff, A. (2002). Revisiting the Visit: Understanding How Technology Can Shape the Museum Visit. *ACM '02*. 146-155
- Hall, T., and Bannon, L. (2005). Designing Ubiquitous Computing to Enhance Children's Interaction in Museums. *Association for Computing Machinery, Inc.* 62-69
- Hatala, M., Kalantari, L., Wakkary, R., and Newby, K. (2004). Ontology and Rule based Retrieval of Sound Objects in Augmented Audio Reality System for

- Museum Visitors. *2004 ACM Symposium on Applied Computing*. 1045-1050.
- Hendricks, Z., Tangkuampien, J., and Malan, K. (2003). Virtual Galleries: Is 3D better? *Association for Computing Machinery, Inc.*
- Hong, J., Chen, B., Hsiang, J., Hsu, T. (2001). Content Management for Digital Museum Exhibitions. *ACM Digital Library*. 450.
- Hornecker, E., and Stifter, M. (2006). Learning from Interactive Museum Installations About Interaction Design for Public Settings. *ACM Digital Library*. 135-142.
- His, S., and Fait, H. (2005). RFID Enhances Visitors' Museum Experience at the Exploratorium. *Communication of ACM*. 60-65.
- Hyvonen, E., Junnila, M., Kettula, S., Makela, E., Saarela, S., Salminen, M., Syreeni, A., Valo, A., and Viljanen, K. (2004). Publishing Museum Collections on the Semantic Web: The MuseumFinland Portal. *ACM Digital Library*. 418 – 419.
- Kalantari, L, Willms, J, and Hatala, M. (2004). Reality System for Museum Visitors. *Communication of The ACM*.
- Mannoni, B. (1996). Bringing Museum Online. *Communication of The ACM*, 99, 100-105.
- Mei, Q. (2004). A Knowledge Processing Oriented Life Cycle Study from a Digital Museum System. *ACMSE '04*. 116-121.
- Mintzer, F., Braudaway, G. W., Giordano, F. P., Lee, J. C., Magerlein, K. A., D'Auria, S., Ribak, A., Shapir, G., Schiattarella, F., Tolva, J., and Zelenkov, A.

(2001). Populating The Hermitage Museum's New Web Site. *Communication of The ACM*. 44. 52-60.

Muzium Neagara. *Muzium Negara Official Website*. (2003). Retrieved January 20, 2008, from <http://www.museum.gov.my/english/home.htm>

National Museum Official Website. www.museum.gov.my

Ochiai, K., Tsumura, N., Nakaguchi, T., Miyata, K., and Miyake, Y. (2000). Gonio-Spectral Based Digital Archiving and Reproduction System for Electronic Museum. *National Museum of Japanese History*. 1.

Rutledge, L., Aroyo, L., and Stash, N. (2006). Determining User Interests About Museum Collections. *ACM Digital Library*. 855-856.

Schafer, J. B., Konstan, J., and Riedl, J. (1999). Recommender Systems in E-Commerce. *Communication of The ACM*.

Sinclair, P., Lewis, P., Martinez, K., Addis, M., Prideaux, D. (2006). Semantic Web Integration of Cultural Heritage Sources. *ACM Digital Library*. 1047-1048.

Spasojevic, M., and Kindberg, T. (2001). A Study of an Augmented Museum Experience. *HP Laboratories Palo Alto*. 1-6.

System Development Life Cycle . (2008). *Wikipedia.com*. Retrieved on February 20, 2008, from http://en.wikipedia.org/wiki/Systems_Development_Life_Cycle

Waterfall Model. (2008). *Wikipedia.com*. Retrieved February 20, 2008, from http://en.wikipedia.org/wiki/Waterfall_model

Werthner, H, and Ricci, F. (2004). E-Commerce and Tourism. *Communication of*

ACM. 47. 101-105.

Rapid Application Development. (2008). *Wikipedia.com*. Retrieved January 23, 2008, from http://en.wikipedia.org/wiki/Rapid_application_development

Wojciechowski, R., Walczak, K., White, M., Cellary, C. (2004). Building Virtual and Augmented Reality Museum Exhibitions. *ACM Digital Library*.135-187.